the professors of pathology, physiology, zoology, and botany, veterinary students will be taught in their respective laboratories, and will enjoy, without increase of fees, all the facilities possessed by medical and science students. They will, in addition, have the advantage of the Tropical Medicine, Cancer Research, and Comparative Pathology Schools. This arrangement will provide for the scientific training of the veterinary student upon a scale equal to that of the medical student.

AT the concluding meeting of the session 1903–4 of the Architectural Association, Mr. A. E. Munby read a paper on the value of science in an architectural curriculum, in which he urged that science should receive more attention from architectural students. He mentioned some interesting particulars as to the number of hours per week devoted to science by students studying in architectural courses in the great technical schools of the world. To give a few examples, Mr. Munby stated that the architectural student at McGill University devotes 7·9 hours a week to science classes; at University College, London, 6·8; at Glasgow Technical College, 5·3; at the University of Illinois, 4·9; and at the Technischen Hochschule, 2·5. To conclude his paper, Mr. Munby made suggestions as to the subjects of science an architectural student should study at the outset of his career. These should include, he thought, a general experimental course on physics, including laboratory work; a similar course dealing with the elements of inorganic chemistry; and a short course outlining the principles of geology and dealing with the stratigraphical arrangement of rocks and with petrology. The whole of this work might be undertaken by a person of average intelligence at the age of, say, sixteen, and completed in one year with some twelve hours' teaching per week.

IN connection with the recent opening of the new buildings, extending the South-Western Polytechnic at Chelsea, the heads of the electrical and mechanical engineering departments have prepared a pamphlet describing the aims and equipments of their respective laboratories. In these laboratories two classes of students receive instruction, viz. those who attend the engineering day courses and those who form the evening classes. The standard of the courses extends far enough to include preparation for the engineering degree of the University of London, and attention is given to the requirements of candidates for the associate membership of the Institution of Civil Engineers. But no particular syllabus is followed, and students are able easily, if necessary, to take other public examinations in engineering. So far as funds have permitted, an attempt has been made to provide in the mechanical engineering laboratory more than one type of some pieces of apparatus, in the belief that the range of experience thus gained by a student is of value, while such a variety enables a number of students to be less thickly distributed over the apparatus. Many of the larger pieces of apparatus have not been specially designed for experimental purposes, but are ordinary standard commercial machines which have been fitted with the necessary measuring appliances by students and the workshop instructor. The electrical engineering laboratories are divided into three principal rooms—the large laboratory where the testing of electrical instruments and the measurement of electrical quantities are carried out; the dynamo room where the experiments and investigations on dynamos and motors are conducted, and the "advanced" laboratory where the standard instruments are kept and used for calibrating the instruments used in experimental work, and where the more advanced alternating and polyphase current experiments are made. In addition to these rooms, there are two rooms fitted up for photometric tests on incandescent and arc lamps respectively. There is also a large wiring shop for instruction in practical wiring and jointing, and two workshops for repairing and making apparatus for the electrical laboratories. There are in all six steam engines specially fitted up for experimental work. Recently, when the electric lighting plant had to be duplicated, advantage was taken of the opportunity for fitting the new engines with measuring appliances, so that experiments could be carried out on them whenever desired. The plant available permits of the setting aside of either of the new engines for experiment, or the unit experimented upon can be made to provide electrical energy for lighting the building (Fig. 1). The pamphlet contains a full description, with illustrations, of all the more important pieces of apparatus in both departments of engineering.

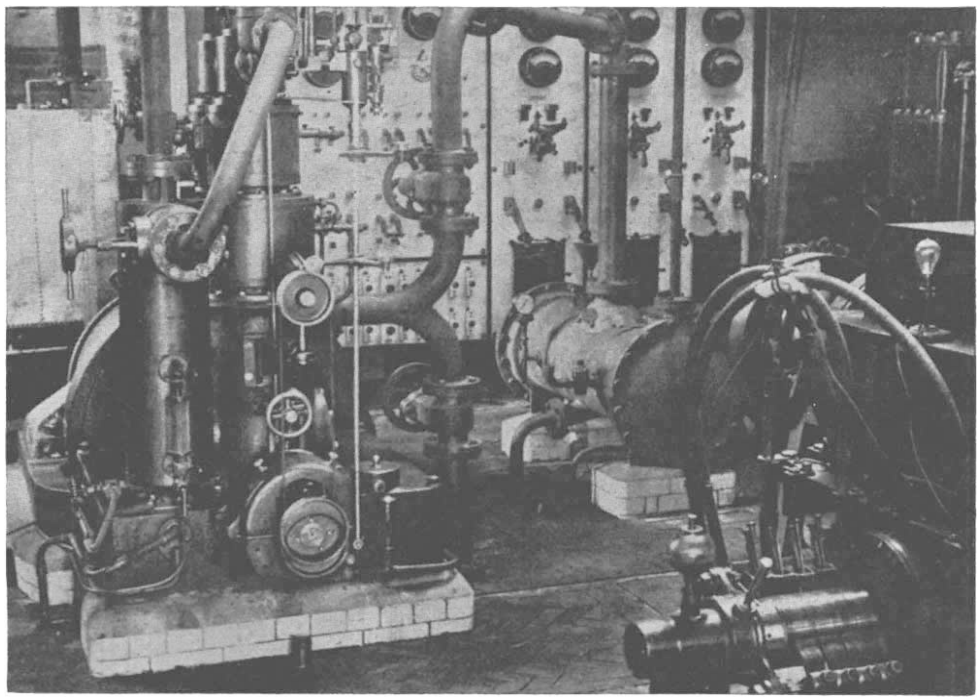

FIG 1.—Main Lighting Plant of the South-Western Polytechnic.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 28.—"The Effects of Changes of Temperature on the Modulus of Torsional Rigidity of Metal Wires." By Dr. Frank **Horton.**

An account of some experiments performed at the Cavendish Laboratory with the view of ascertaining as accurately as possible the manner in which the modulus of torsional rigidity varies with the temperature. The metals experimented on were copper, iron, platinum, gold, silver,

aluminium, tin, lead, cadmium, all chemically pure, and also specimens of commercial copper and of steel pianoforte wire. A dynamical method of experimenting was employed, the torsional oscillations of the wire under test being timed by a method of coincidences capable of great exactness. The method of coincidences is usually only applied to the comparison of two nearly equal times, but it is shown to be equally applicable to any two periods, even if they are quite different. Observations were made, in general, at five temperatures, viz. at the temperature of the room, about 16° C., at 35° C., 55° C., 75° C. and 100° C., and also in some cases at 126° C., the higher temperatures being obtained by using the vapours of various liquids boiling under atmospheric pressure. The coefficients of expansion of the wires used (which are required in order to compare observations at different temperatures) were determined by means of the measuring bench in the physical laboratory of the University of Birmingham. The internal viscosities of the wires, and the effect of increased amplitude of vibration, were also investigated. The main observations for the rigidity determinations were all taken at an average amplitude of fourteen minutes.

The following is a summary of the principal results :—

(1) In all the materials examined, with the exception of pure copper and of steel, the modulus of rigidity at one temperature is not constant, but increases as time goes on.

(2) The diminution of the modulus of rigidity per degree rise of temperature between 10° C. and 100° C. is constant for pure copper and for steel, but not for any of the other materials examined.

(3) In general, the effect of heating to a high temperature is to increase the value of the rigidity modulus at lower temperatures.

(4) The internal viscosity of all the metals examined, with the exceptions of soft iron and steel, increases with the temperature. The internal viscosity of soft iron decreases rapidly with rise of temperature, and reaches a minimum value at about 100° C. There is a slight decrease also in the case of steel.

(5) Repeated heating and continued oscillation through small amplitudes decrease the internal friction.

(6) Both the internal friction and the period of torsional vibration increase with the amplitude of oscillation.

(7) Vibration through a large amplitude considerably alters both the logarithmic decrement and period of oscillation at smaller amplitudes.

(8) The internal viscosity of a well annealed wire suspended and left to itself gradually decreases.

"On the Sparking Distance between Electrically Charged Surfaces." By Dr. P. E. **Shaw.**

Recent investigation (1901) on this subject has been made by R. F. Earhart, who used voltages from 1000 to 38, the corresponding distances being from 100 microns to ¼ micron. In the present paper the voltages range from 150 to ½, and the distances of discharge from 1 micron to 1/500 micron. The instrument used to measure these small distances is the electric micrometer, which works on the principle of electric touch, and is therefore specially suitable to measurements of this kind.

The relation between voltage and sparking distance is found to be linear, and direct from the origin; hence it is evident that there is no change in dielectric strength in any film or films existing on the surfaces of the solid bodies used at the points of discharge. Since 1 volt or thereabouts is so frequently employed in electric circuits, there is especial interest in knowing the sparking distance for this voltage; it is about 1/100 micron, and unless sufficient pressure is used to squeeze out dust or films until the metal surfaces approach to this distance, no current can pass.

The two surfaces used for discharge are a bead and a plane, generally of polished iridio-platinum. The pressure used is atmospheric. In working with such minute distances care must be taken to exclude extraneous vibrations, and the surfaces must be re-polished after every discharge except when the voltages are less than 10. In every case the discharge is observed by a telephone suitably shunted.

Geological Society, April 27.—Dr. J. E. Marr, F.R.S., president, in the chair.—On a new species of Eoscorpius from the Upper Carboniferous rocks of Lancashire: W. **Baldwin** and W. H. **Sutcliffe.** The specimen described was found in an ironstone-nodule occurring on a fairly well marked horizon, about 135 feet above the Royley Mine (or Arley Mine) coal-seam, at Sparth Bottoms, south-west of Rochdale Town Hall. The nodules occur in a band of blue shale, in which are well preserved remains of *Carbonicola acuta,* ferns, Calamaria, *Prestwichia rotundata,* and *Bellinurus bellulus.* The animal is well represented by both the intaglio and relievo impressions; these, however, only show its dorsal aspect. The specimen is referred to a new species. Dr. Peach is of opinion that the ancient species visited the sea-shore in search of the eggs of invertebrates, and the association of this new scorpion with king-crabs at Sparth Bottoms is in favour of this view.—The genesis of the gold-deposits of Barkerville (British Columbia) and the vicinity: A. J. R. **Atkin.** The gold-bearing area of Cariboo is roughly confined, within a radius of 20 miles of Barkerville, to the band of crystalline rocks known as the Cariboo schists, generally assigned to the Lower Palæozoic group. The veins follow the strike but not the dip of the rocks; the gangue is similar to that associated with the nuggets in the placers. While all the reefs carry gold, none have been found rich enough to account for the placer-gold. The placer-gold has probably been derived from the enriched outcrops of the veins which once existed above water-level. Such enrichment is due to the leaching out of pyrites leaving the less soluble gold in lighter quartz, and to actual enrichment by precipitation. While the enriched zone was being formed, the weathering of the surface kept removing the leached outcrop, and constantly exposing fresh surfaces to atmospheric influences. To the weathering of these outcrops the rich placers are attributed. The denudation of the reefs and the deposition of gold in the gravels appear to have taken place in Tertiary times.

Zoological Society, May 3.—Mr. G. A. Boulenger, F.R.S., vice-president, in the chair.—Mr. Oldfield **Thomas,** F.R.S., read a paper on the osteology and systematic position of the rare Malagasy bat *Myzopoda aurita.*—Mr. F. E. **Beddard,** F.R.S., read a third of a series of papers on the anatomy of the Lacertilia, which dealt with points in the vascular system of chamæleon and other lizards.—A communication was read from Mr. A. D. **Imms** containing notes on the gill-rakers of the ganoid fish Polyodon.—Dr. W. G. **Ridewood** read a paper on the cranial osteology of the fishes of the families Elopidæ and Albulidæ, with remarks on the morphology of the skull in the lower teleostean fishes generally.

Entomological Society, May 4.—Prof. E. B. Poulton, F.R.S., president, in the chair.—Mr. W. J. **Kaye** exhibited a piece of the plant *Eupatorium macrophyllum* from British Guiana, attractive to Lycorea, Melinæa and Mechanitis species of that region, and a remarkable larva-like twig of birch. The resemblance was so complete that even the head, the segments, the appressed legs and the anal claspers appeared to be represented. It had been found on Oxshott Heath while searching for larvæ of *Geometra papilionaria.* He also exhibited on behalf of Mr. C. P. Pickett a pupa of *Rumia crataegata* which had spun up in an empty pupa case of *Pieris brassicae.* The latter was on the roof of a breeding-cage, and the geometrid larva had completely crept inside to spin its cocoon.—Mr. J. E. **Collin** exhibited *Corethra obscuripes,* v. d. Wolf (?=*C. fusca,* Staeg.), a little known species of the genus, and new to the British list, which he had found in some numbers at Newmarket.—Mr. G. T. **Porritt** exhibited a living larva of *Agrotis ashworthii,* of which species he had found considerable numbers on one of the mountains of Carnarvonshire during the last week in April.—Commander J. J. **Walker,** R.N., exhibited a gall sent him by Mr. Harold S. Mort, identified by Mr. Froggart as *Brachycelis duplex,* Schrader, and found at Wentworth Falls, Blue Mountains, N.S.W., where it was by no means common.—Mr. G. H. **Verrall** exhibited three specimens from the Hope collection at Oxford of *Neoitamus cothurnatus,* Meig., an Asilid not previously recorded as British. They were taken near Oxford by Mr. W. Holland. He also stated that the Anthrax exhibited at the last meeting on behalf of Mr. R. G. Bradley was *A. circumdata,* Meig., a species recorded before, but not observed for more than fifty years past.—

The **President** exhibited a Longicorn beetle captured near Malvern, Natal, by Mr. C. N. Barker, together with a large Bracon from the same locality, to which, on the wing, it showed a close superficial resemblance.—Mr. H. J. **Turner** exhibited living larvæ and cases of several species of the lepidopterous genus Coleophora, and contributed notes on them.—Dr. A. Jefferis **Turner** communicated a paper entitled "A Classification of the Australian Lymantriadæ."—Dr. F. A. **Dixey** read a paper by Major Neville Manders, R.A.M.C., entitled "Some Breeding Experiments on *Calopsilia pyranthi*, and Notes on the Migration of Butterflies in Ceylon."

Chemical Society, May 5.—Prof. W. A. Tilden, F.R.S., president, in the chair.—The following papers were read:—The slow combustion of ethane: W. A. **Bone** and W. E. **Stockings.** The hydrocarbon is first oxidised to acetaldehyde, the latter then passes into formaldehyde, and this is eventually oxidised to carbon dioxide, carbon monoxide and steam.—The action of radium rays on the halides of the alkali metals, and analogous effects produced by heat: W. **Ackroyd.** The γ-rays from radium bromide produced no colour change with lithium chloride, but with sodium, potassium, rubidium and cæsium chlorides produced yellow, violet, bluish-green and green transitory colorations respectively. These changes are analogous to the thermal effects produced in other substances, and are probably like these purely physical.—The mutarotation of glucose and galactose. Solubility as a means of determining the proportions of dynamic isomerides in equilibrium: T. M. **Lowry.** The author has applied the method already used in the case of β-bromonitrocamphor to these sugars, and finds that the stereoisomerides are approximately equally stable, and are present in about equal proportions in solutions.—A study of the substitution products of *ar*-tetrahydro-α-naphthylamine. 4-Bromotetrahydro-α-naphthylamine and *ar*-tetrahydro-α-naphthylamine-4-sulphonic acid: G. T. **Morgan,** Miss F. M. G. **Micklethwait** and H. B. **Winfield.**—Studies in the tetrahydronaphthylamine series, part ii., halogen derivatives of *ar*-tetrahydro-β-naphthylamine; part iii., reaction between *ar*-tetrahydro-β-naphthylamine and formaldehyde: C. **Smith.** A description of the derivatives obtained in these reactions.—The resin acids of the Coniferæ, part i., the constitution of abietic acid: T. H. **Easterfield** and G. **Bagley.** A description of the various decomposition products of abietic acid is given; a study of these led the authors to the conclusion that this resin acid is a decahydroretenecarboxylic acid, and they suggest that in retene the methyl and *iso*propyl groups occupy a *meta* position relatively to each other.—Additive products of benzylideneaniline with ethyl acetoacetate and ethyl methylacetoacetate: F. E. **Francis** and Miss M. **Taylor.** These additive products are shown to exist in one form only.—Studies on ethyl carboxyglutarate, part i., action of acids on ethyl sodiocarboxyglutarate: O. **Silberrad** and T. H. **Easterfield.**—Studies on optically active carbimides, part i.: A. **Neville** and R. H. **Pickard.**—The comparison of the rotation values of methyl, ethyl and *n*-propyl tartrates at different temperatures: T. H. **Patterson.** It is shown that a connection between the rotation values of these esters may be traced when the comparison is made at corresponding temperatures.—Note on the action of hydrogen sulphide on formaldehyde and acetaldehyde solutions: J. **Drugman** and W. E. **Stockings.** A description of a number of complex thio-derivatives obtained in these reactions.—The viscosity of liquid mixtures: A. E. **Dunstan.** The effects of the chemical affinity, molecular aggregation, and to some extent of the chemical constitution of the constituents on the viscosities of liquid mixtures are discussed.—The conversion of *iso*propyl alcohol into *iso*propyl ether by sulphuric acid: F. **Southerden.** In opposition to the experience of previous investigators, the author has obtained a small yield of *iso*propyl ether by this reaction.

Royal Astronomical Society, May 13.—Prof. H. H. Turner, F.R.S., president, in the chair.—The secretary gave an account of a paper by Dr. **Downing** on the definitive places of the standard stars for the northern zones of the Astronomische Gesellschaft, and also of two papers by Mr. **Cowell** on the moon's errors in longitude.—A brief account was given of a second series of double star measures by the Rev. T. E. **Espin.**—The **Astronomer Royal** read a paper on the new Greenwich micrometer for measurement of photographs of Eros. As the measures were required for determination of the solar parallax, a greater degree of accuracy was necessary than for the Astrographic Chart. A new instrument was therefore constructed, on the lines of Mr. Hinks's Cambridge measuring machine, and the results obtained with it were extremely satisfactory, the measures being remarkably accordant. The micrometer was described and illustrated by photographs shown on the screen.—Mr. **Franklin-Adams** read a paper on his photographic chart of the heavens, to Argelander's scale $1^\circ = 20$ mm. After much preliminary work and an extended series of experiments, a 10-inch photographic lens was made by Messrs. Cooke and Sons from designs by Mr. Dennis Taylor, and this was provided with a specially constructed mount of the English form, with two guiding telescopes instead of one, and various other improvements. The instrument was taken to the Cape in June, 1903, and by the kindness of Sir D. Gill was erected in the grounds of the observatory. The work of photographing the southern heavens on 115 plates, each 15 inches square, with two hours' exposure, was practically completed, as well as a set with triple exposures, and another taken with a 6-inch lens. The star images were very good, even towards the edge of the plates, the lenses having proved extremely satisfactory, and the driving arrangements specially good. Photographs of the instrument and specimens of the plates were shown on the screen.—Mr. **Bellamy** gave an account of his paper on a new cluster in Cygnus, and other papers were taken as read.

PARIS.

Academy of Sciences, May 16.—M. Mascart in the chair.—The president announced to the Academy the loss by death of M. Marey, member of the section of medicine and surgery, and of M. Sarrau, member of the section of mechanics. The death of Prof. Williamson, correspondant for the section of chemistry, was also announced.—The cooling power of a feebly conducting fluid current on a body limited in every direction: J. **Boussinesq.**—On the electrolysis of calcium chloride: H. **Moissan.** A reply to some criticisms of M. Bullier with reference to a claim for priority.—The effect of small oscillations of temperature on a system affected by hysteresis and viscosity: P. **Duhem.** Small oscillations of external action and of temperature have no appreciable influence on the transformation of a system when the coefficient of viscosity of this system is large with respect to the amplitude of the oscillations.—Researches relative to the resistance of the air made by means of a new apparatus called the dynamometric balance: Ch. **Renard.** Two different forms of apparatus are described, the simple balance, which permits of the calibration of wind vanes for dynamometers, and the double balance, specially employed in the study of helices. Three illustrations are given.—On the function of the *n*-rays in causing changes of visibility in feebly illuminated surfaces: Jean **Becquerel.** The conclusion is drawn from the experiments described that the change in the distinctness and luminosity of feebly lighted surfaces submitted to the action of the *n*-rays is probably to be attributed, at least in great part, to a variation in the sensitiveness of the vision arising from the *n*-rays directed on the surfaces, and not to an appreciable variation in the light emitted.—The explanation of some colour phenomena shown by a tube containing rarefied gas: H. **Pellat.**—On the microscopic state of the poles and the discharge spectra: B. **Eginitis.**—On the density of aqueous saline solutions considered as an additive property of the ions, and on the existence of some hydrated ions: P. **Vaillant.**—A new method for the exact determination of the molecular weights of the permanent gases; the atomic weights of carbon, hydrogen and nitrogen: Ph. A. **Guye.** The author, with M. Friderich, has previously established that the van der Waals equation leads to the relation $V_m(1+a)(1-b)=R$, where V_m represents a gram-molecule at 0° C. and under the pressure of one atmosphere, a and b the two constants of the equation of fluids with respect to unit volume, and R the gas constant. In the present paper R is replaced by $R-mT_o$. By applying this relation to the experimental results of Leduc, Morley and Rayleigh, the values of the atomic weights of hydrogen,

carbon and nitrogen are determined. For the last named element the mean value is 14·004, as against the figure of 14·057 of Stas.—On the preparation and properties of hypophosphorous acid: C. **Marie.** Two methods are given, starting from the barium and sodium salts respectively, both of which yield a pure crystalline acid of melting point 26·5. The decomposition by heat was also studied, and the equation ordinarily accepted for this change shown to be erroneous.—On a crystallised chromous tartrate: G. **Bauge.**—Colouring matters derived from triphenylmethane: Charles **Lauth.**—The preparation of the α-β-ketonic esters: L. **Bouveault** and A. **Wahl.** A study of the reaction between nitrogen peroxide and ethyl isonitrosoacetoacetate.—The action of phosphorus trichloride and some primary cyclic amines at the boiling point; the reduction of the chloride with the formation of phosphorus: P. **Lemoult.**—On some new polymers of formaldehyde: A. **Seyewetz** and M. **Gibello.**—The action of paraformaldehyde upon the sesquiterpenes: P. **Genvresse.** Carophyllene, clovene and cadinene all combine with formaldehyde.—Researches on the mechanism of the circulation of aromatic compounds in plants: Eug. **Charabot** and G. **Laloue.**—The action of heat and acidity on amylase: P. **Petit.**—The organisation and morphogeny of the Ætheridæ: R. **Anthony.**—Observations on Gymnoascus and Aspergillus: P. A. **Dangeard.**—Some remarks on the ancient Cryptogams and fossil plant soils: B. **Renault.**—Study of the spinal cord by means of the *n*-rays: André **Broca** and A. **Zimmern.** From their preliminary observations the authors conclude that the examination of the spinal cord by means of the *n*-rays allows of the demonstration on the living man of the existence of medullary centres, and even to gain some idea of their degree of activity.—On the presence of geminal nuclei in the cells of certain tissues of the guinea pig: Maurice **Pacaut.**—Light, food, and chlorophyll as modifying factors in the development of Amphibia: Georges **Bohn.**—On a mode of bacterial extraction of spring and river water by means of fine sand: P. **Miguel** and H. **Mouchet.**

DIARY OF SOCIETIES.

THURSDAY, MAY 26.

ROYAL INSTITUTION, at 5.—Literature and the State: H. G. Wells

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—High Speed Electric Railway Experiments on the Marienfelde-Zossen Line: Alexander Siemens.

FRIDAY, MAY 27.

ROYAL INSTITUTION, at 9.—The Progress of Oceanography: H.S.H. Albert Prince of Monaco.

PHYSICAL SOCIETY, at 5.—The Law of Action between Magnets and its bearing on the Determination of the Horizontal Component of the Earth's Magnetic Field with Unifilar Magnetometers: Dr. C. Chree, F.R.S.—On the Ascertained Absence of Effects of Motion through the Ether in Relation to the Constitution of Matter on the FitzGerald-Lorentz Hypothesis: Prof. J. Larmor, Sec.R.S.—On Coherence and Recoherence: Dr. P. E. Shaw and C. A. B. Garrett.

SATURDAY, MAY 28.

ROYAL INSTITUTION, at 3.—Spitsbergen in the 17th Century: Sir W. Martin Conway.

MONDAY, MAY 30.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—A Journey to the North of the Argentine Republic: F. O'Driscoll.

TUESDAY, MAY 31.

ROYAL INSTITUTION, at 5.—The Solar Corona: H. F. Newall, F.R.S.

SOCIETY OF ARTS, at 4.30.—The Economic and Industrial Progress and Condition of India: J. E. O'Conor.

WEDNESDAY, JUNE 1.

ENTOMOLOGICAL SOCIETY, at 8.

SOCIETY OF PUBLIC ANALYSTS, at 8.—The Analysis of Condensed Milk: J. B. P. Harrison.—Roasted Beetroot: E. G. Clayton.—A Collection of Readings with the Zeiss Oleo-Butyrometer: William Chattaway and C. G. Moor.—Note on the Estimation of Sugars and Starch in Vegetable Substances: John S. Ford.

THURSDAY, JUNE 2.

ROYAL SOCIETY, at 4.30.—*Probable Papers*:—On the Aurora Borealis and the Electric Charge of the Sun: Prof. S. Arrhenius.—Colours in Metal Glasses and in Metallic Films: J. C. Maxwell Garnett.—On a Direct Method of Measuring the Coefficient of Volume-elasticity of Metals: A. Mallock, F.R.S.—A Method of Measuring Directly High Osmotic Pressures: The Earl of Berkeley and E. G. J. Hartley.—The Advancing Front of the Train of Waves Emitted by a Theoretical Hertzian Oscillator: Prof. A. E. H. Love, F.R.S.—On the General Circulation of the Atmosphere in Middle and Higher Latitudes: Dr. W. N. Shaw, F.R.S.—On the Magnetic Changes of Length in Annealed Rods of Cobalt and Nickel: Shelford Bidwell, F.R.S.—On the Electric Effect of Rotating a Dielectric in a Magnetic Field: Dr. Harold A. Wilson.

ROYAL INSTITUTION, at 5.—Literature and the State: H. G. Wells.

LINNEAN SOCIETY, at 8.—The Species of Impatiens in the Wallichian Herbarium: Sir Jos. D. Hooker, G.C.S.I., F.R.S.—Biscayan Plankton. Part III. Chætognathia: Dr. G. H. Fowler.—The Flow of Fluids in Plant-stems: Prof. R. J. Anderson.

RÖNTGEN SOCIETY, at 8.30.—Experiments to Determine the Effects of Form and Winding upon Resonance Phenomena: Dr. Clarence A. Wright.

INSTITUTION OF MINING ENGINEERS, at 11 a.m.—Suggestions respecting the Institution of Mining Engineers: Prof. R. A. S. Redmayne.—Coal-mining in the Faroe Islands: G. A. Greener.—Tin-mining in the Straits Settlements, with a few Notes regarding Chinese Labour: W. T. Saunders.—Underground Temperatures, especially with regard to Coal-mines: Dr. Hoefer.—The Hammer-Fennel Tachymeter-theodolite: A. O. Eoll.—Notes on the Report of the Departmental Committee on the Use of Electricity in Mines: Sydney F. Walker.—A Comparison of Three-phase and Continuous Currents for Mining Purposes: Roslyn Holiday.—Electric and Compressed-air Locomotives: B. S. Randolph.—Work of Conveyors on Longwall Faces: Robert G. Ware.

CHEMICAL SOCIETY, at 8.—*iso*Nitrosocamphor: M. O. Forster.—Imino-Ethers and Allied Compounds corresponding with the Substituted Oxamic Esters: G. D. Lander.—The Action of Heat on α-Hydroxycarboxylic Acids: Part I. α-Hydroxystearic Acid: H. R. Le Sueur.—The Basic Properties of Oxygen. Additive Derivatives of the Halogen Acids and Organic Compounds and the Higher Valencies of Oxygen. Asymmetric Oxygen: E. H. Archibald and D. McIntosh.

FRIDAY, JUNE 3.

ROYAL INSTITUTION, at 9.—The Development of the Theory of Electrolytic Dissociation: Prof. Svante Arrhenius.

INSTITUTION OF MINING ENGINEERS, at 10.30 a.m.—The Firing of Babcock Boilers with Coke-oven Gases: T. Y. Greener.—Explosives and Lamp Testing Station at Frameries: Victor Watteyne.—The Transvaal Kromdraai Conglomerates: A. R. Sawyer.—The Southern Rand Goldfield: A. R. Sawyer.—The Occurrence of Cinnabar in British Columbia: G. F. Monckton.—Prevention of Accidents in Winding: John H. Merivale.—Petroleum and its Use for Illumination, Lubricating and Fuel Purposes: P. Dvorkovitz.—The Analytical Valuation of Gas Coals: G. P. Lishman.—A New Process of Chlorination for Mixed Gold and Silver Ores: H. F. Brown.—Graphite-mining in Ceylon and India—Part I. Ceylon: G. A. Stonier.

SATURDAY, JUNE 4.

ROYAL INSTITUTION, at 3.—Spitsbergen in the Seventeenth Century: Sir W. Martin Conway.

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